REMARKS

I. Status of Claims

Prior to entry of this paper, **Claims 1-25, 27 and 28** were pending. In the non-final Office Action issued September 15, 2008, Claims 1-25, 27 and 28 were rejected. In this paper, Claims 1, 8-10, 12, 24, 25, and 27 are amended; no claims are cancelled; and no claims are added. Claims 1-25 and 27-28 are currently pending. No new matter is added by way of this amendment. For at least the following reasons, Applicant's representative respectfully submits that each of the presently pending claims is in condition for allowance.

II. Claim Rejections - 35 U.S.C. § 101

The reconsideration and withdrawal of previous rejections under 35 U.S.C. § 101 is hereby acknowledged and appreciated.

IV. Claim Rejections - 35 U.S.C. § 103

Claims 8-10 were rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al., U.S. Patent No. 6,370,620 B1 (hereinafter "Wu"), in view of Scharber, U.S. Patent No. 6,542,964 B1 (hereinafter "Scharber") and Lamburt, U.S. Patent No. 6,374,241 B1 (hereinafter "Lamburt").

With this paper, **Claim 8** has been amended to clarify grounds of distinction, and thus patentability, for the claimed invention over the prior art of record. Support for this amendment can be found throughout the application, including on page 19, lines 17-24 of the specification. As amended, Claim 8 at least includes the limitation:

- determining a frequency of requests summed from requests for all content of a plurality of different static content in a content set, wherein the content set includes the requested content,

- if the frequency of requests for the plurality of different static content in the content set exceeds a threshold, forwarding the request for the static content over the network

After carefully reviewing the references previously applied, it is respectfully submitted that at least these limitations are not suggested by the cited prior art, including when considered

with the other limitations of amended Claim 8 as a whole. As noted previously, Wu discloses "the front-end router 803 should service only requests for *a given object* that exhibit reference locality, in other words, requests for *a given object* that occur closely enough together in time to justify devoting space in the cache to storing that given object" and "One approach to identifying requests for such objects is to count the requests for *a given non-assigned-partition object 103."* (Wu, col. 6, line 48-54, emphasis added). For each *single* reference count, Wu discloses accounting for the requests for a *single* "given object". Wu does not suggest one "reference count" referring to a plurality of objects, nor a "reference count" for a plurality of objects that affects the handling of an individual one of this plurality of objects.

In contrast to Wu, the claimed invention as further represented in amended Claim 8 comprises " *a frequency of requests summed from requests for all content of a plurality of different static content in a content set*" wherein "*the content set includes the requested content"* and *"if the frequency of requests for the plurality of different static content in the content set exceeds a threshold, forwarding the request for the static content over the network*". As such, it is respectfully submitted that Wu does not suggest the cumulative result or decision basis as further recited in at least the above reproduced limitation of amended Claim 8.

Moreover, Wu in combination with Scharber and Lamburt does not suggest this limitation either. Scharber merely discloses "content", but does suggest a common frequency associated with a plurality of different static content(see, for example, col. 6, lines 50-52 of Scharber). "Hot" and "cold" are disclosed in Lamburt with regard to "Least Recently Used", which lacks reference to even a count, much less the frequency and plurality of content as claimed (col. 27, lines 36-40 of Lamburt). For this reason, it is respectfully submitted that the prior art references, even when considered in combination with each other, do not render obvious the limitations of amended Claim 8. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully submitted.

So far as amended **Claims 9 and 10** depend from amended Claim 8, it is respectfully submitted that these claims are not taught or suggested for at least the same reasons presented herein with regard to amended Claim 8. Accordingly, withdrawal of these rejections is also respectfully requested.

With additional regard to amended **Claim 10,** it is further noted that Wu does not teach or suggest particularly the notion of "a third request" in the limitation of "*when the content is unavailable from the second cache, a third request for the content is forwarded over the network to a content server*". The portion of Wu cited in the Office Action, lines 4-28 of column 6, refers to *one* request. This *single* request is the same one that is initially received and then re-directed or returned (col. 6, lines 6, 21, and 25). Even in combination with col. 6, lines 43-59 of Wu, which notably involves a different embodiment and a different implementation of caching control, this passage of Wu at best suggests a second request from a client browser, not a "*third request*" as further claimed in at least amended Claim 10. For this additional reason, withdrawal of the rejection under 35 U.S.C. §103(a) is also respectfully requested.

Claims 12, 14-17, 19, 21 and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Wu in view of Scharber, Lamburt, Banerjia et al., U.S. Patent Publication No. 2001/0049818 A1 (hereinafter "Banerjia") and Palanca et al., U.S. Patent No. 6,216,215 B1 (hereinafter "Palanca").

With this paper, **Claims 12 and 25** have been amended to clarify at least one distinction, and thus patentability, for their respective claimed inventions over the prior art of record. Specifically with regard to at least amended Claim 12, the nature of forwarding of requests has been clarified to refer to a comparison made between a received request and a previously forwarded request. Support for this amendment can be found throughout the specification, and particularly on page 18, lines 11-24.

As amended, Claim 12 at least includes the limitation:

- a forwarder that receives each request for content in the system and forwards each request over the network to at least one of a content server and one of a plurality of caches including at least a hot cache and a regular cache, wherein the forwarding of each request is based on ...a determination if a request for the content received at the forwarder is coming from a cache in the plurality of caches to which the forwarder previously forwarded a prior request over the network for the content

After carefully reviewing the references previously applied, it is respectfully submitted that

at least this limitation is not taught or suggested by the cited prior art, including when considered with the other limitations of amended Claim 12 as a whole.

As previously noted, Wu in view of Scharber, Lamburt, and Banerjia, do not suggest this limitation. The server (4) of Wu handles a current request in terms of the immediate source of the request (step 402, col. 4, lines 53-55 of Wu). After forwarding a request, the server (4) "waits for the object", not another request (col. 4, lines 58 and 63-64 of Wu). Scharber discloses a cache (30) that receives responses from other caches, but not requests (col. 4, lines 37-51 of Scharber). Lamburt discloses that items are detected in a cache based on a cache name for a query (col. 31, lines 10-24 of Lamburt). Banerjia discloses a system that handles the execution of translations and, as such, does not involve a forwarder that forwards requests, much less a request for content from a cache that was a previous recipient of such a request (paragraph [0024] of Banerjia).

In the most recent Office Action, the reference of Palanca was further applied with regards to the above reproduced limitation. However, it is respectfully submitted that this combination fails to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for a plurality of reasons.

First, the disclosure of Palanca pertains to an art that is distinct and unrelated to that of Wu, Schaber, Lamburt, and Banerjia. Palanca pertains to internal registers of a microprocessor (110) and other caches connected internally across a bus in a computer system (100) (Figure 2 of Palanca). In contrast, other applied references, such as Wu, disclose web cache servers that are connected over networks such as a wide area network (3) and a local area network (7) (Figure 1 of Wu). At the level of detail given in the disclosures of Wu and Palanca, as well as the "*system*" further claimed in amended Claim 12, a wide area network simply does not equate to or suggest an internal computer bus. The disparity between these two, clearly different systems is particularly evidenced by the motivation statement given in the most recent Office Action, which states:

> "The write-back masking also avoids contention on the writeback bus with another instruction. This is implemented by masking (i.e., clearing) the write-back data valid signal to the re-order buffer and register file 220. The L1 cache controller 250 retires all non-senior loads by asserting the write-back data valid signal when the requested data is available," (lines 7-13 of column 10 in Palanca). It is for this reason that one of ordinary skill in the art at the time of the applicant's invention would have been motivated to have a determination of a request for content coming from a cache in the plurality of caches to which the forwarder previously forwarded a request for the content in the system as taught by Wu.

Yet, the networks and cache servers of Wu do not experience "contention" on a writeback bus between "another instruction" because Wu does not disclose a writeback bus, nor the retiring of instructions. Again, the web cache servers in Wu are connected via a wide area network, such as the Internet, and therefore do not experience the communication issues that are cited and relied upon in Palanca. Modifying the system of Wu to be connected over a bus would defeat the purpose of having a network cache, and even the network itself, rendering Wu clearly unsuitable for its intended purpose. See MPEP 2143.01(V). Because Wu pertains to such a different field than that of Palanca, the above reproduced motivation statement, in effect, alleges to cure a problem that the web cache servers of Wu do not have. The extent of this difference would not provide one of ordinary skill in the art at the time of invention with knowledge of how to combine these distinct components of Wu and Palanca, much less provide a motivation for doing as such.

In fact, the "write-back data valid signal" of Palanca is the "only" signal returned in the cited disclosure of Palanca, and explicitly "not the data itself" (see col. 8, lines 1-5). This clearly conflicts with the disclosure of Wu, wherein "if the requested object can be found", the "object is returned" (col. 4, lines 48-53). This difference additionally illustrates the lack of compatibility between the teachings of Wu and Palanca, further precluding the proposed combination thereof under 35 U.S.C. § 103(a).

Regardless, the disclosure of Palanca does not suggest the above reproduced limitation of amended Claim 12. The most recent Office Action, at page 4, lines 10-16, cites lines 1-7 of column 10 of Palanca, notes "wherein the write-back data valid signal denotes that the request is coming from a cache that it had previously forwarded a request (on a cache miss)". However, the "write-back valid data signal" is not a "*request for the content*" as further claimed in amended Claim 12; in fact, the assertion of the "write-back valid data signal" of Palanca explicitly does not differentiate between a "L1 cache hit" and an "L1 buffer allocation" (col. 10, lines 1-3 of Palanca), which fails to suggest "*a determination if a request for the content received at the forwarder is coming from a cache*", much less a "*cache in the plurality of caches to which the forwarder previously forwarded a prior request over the network for the content*" as further claimed in amended Claim 12.

The related operation in Palanca, shown as step 3 in Figure 6, is also executed before the forwarding of the same request to an L2 cache (col. 9, lines 8-10) and explicitly "clears" a signal regarding the result of such a request (col. 10, lines 5-7). Clearly, a signal that precedes the sending of a request and then eliminates an indication of the results of the request does not suggest "*a determination if a request for the content received at the forwarder is coming from a cache in the plurality of caches to which the forwarder previously forwarded a prior request over the network for the content*" as further claimed in amended Claim 12. Also, use of the "write-back data signal" of Palanca (col. 9, line 1-2) is involved with "retiring senior loads from the L1 cache controller" (col. 9, lines 41-42) or "retires all non-senior loads" (col. 10, line 10), which does not suggest "forwards each request over the network" based on "*a determination*" as is further claimed in amended Claim 12. Finally, the "write-back data signal" is sent to "the re-order buffer and register file (220)" (col. 9, lines 1-2), different from the source of the request, the "memory ordering unit 240" (col. 8, lines 64-66), which fails to suggest "*a request for the content received at the forwarder*" is coming from a cache in the plurality of caches to which "*the forwarder previously forwarded a prior request*" as further claimed in amended Claim 12.

For at least these reasons, it is respectfully submitted that the prior art references, even when considered in combination with each other, do not render obvious the claimed invention of amended Claim 12. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

So far as **Claim 25** has been amended to include a similar, albeit different limitations, it is respectfully submitted that this claim is also not taught or suggested for at least the same reasons presented herein with regard to amended Claim 12. Accordingly, withdrawal of this rejection of amended Claim 25 under 35 U.S.C. §103(a) is also respectfully requested.

So far as **Claims 14-17, 19, and 21** depend from Claim 12, it is respectfully submitted that these claims are not taught or suggested for at least the same reasons presented herein with regard to Claim 12. Accordingly, withdrawal of these rejections is also respectfully requested.

Claims 1, 24 and 27-28 were rejected under 35 U.S.C. 103(a) as being unpatentable over Trout, U.S. Patent No. 5,566,349 (hereinafter "Trout") in view of Lamburt, Scharber, Banerjia and Jordan et al., U.S. Patent Publication No. 2002/0026560 A1 (hereinafter "Jordan").

With this paper, **Claim 1** has been amended to clarify at least one distinction, and thus patentability, for the claimed invention over the prior art of record. Specifically with regard to at least amended Claim 1, the nature of forwarding of requests has been clarified to refer to different requested generated by different caches in the hierarchy based on receipt of a previously forwarded request. Support for this amendment can be found throughout the application as originally filed, including on page 14, lines 10-18 of the specification.

As amended, Claim 1 at least includes the limitation:

forwarding the request over the network to the plurality of caches that enable access to the static content further comprises recursively forwarding requests, generated from different caches in the hierarchy based on the received request and receipt of one of the recursively forwarded requests at each of the different caches in the hierarchy, through the hierarchy until a frequency of the request for static content exceeds a threshold associated with the hot cache

After carefully reviewing the references previously applied, it is respectfully submitted that at least this limitation is not taught or suggested by the cited prior art, including when considered with the other limitations of amended Claim 1 as a whole. Trout does not teach or suggest forwarding a request, much less performing any form of recursive forwarding of requests from different caches; rather, data is simply retrieved from a data cache using a routine (col. 12, lines 9-11 of Trout). On page 10, lines 5-15, the most recent Office Action acknowledges that Trout does not teach such a limitation.

The other previously applied references do not suggest this limitation either. As noted above, Scharber discloses a cache 30 that receives responses from other caches 34, but not requests from different caches based on the initially received request (col. 4, lines 37-51 of Scharber). Lamburt discloses that items are detected in a cache based on a cache name for a query, which fails to even suggest the claimed form of recursive forwarding (col. 31, lines 10-24). Banerjia discloses a system that handles the execution of translations and, as such, does not involve a forwarder that

forwards requests, much less a request for content from a cache that was a previous recipient of such a request (paragraph [0024]).

In the most recent Office Action, the newly applied reference of Jordan was held to suggest this limitation. However, the system of Jordan "proactively" shifts one or more subsequent forwarded requests away from an "owning server", which fails to teach or suggest "*requests, generated from different caches in the hierarchy based on ... receipt of one of the recursively forwarded requests at each of the different caches in the hierarchy*" as further claimed in amended Claim 1. To reiterate, preventing receipt of subsequent requests does not suggest generating requests based on "*receipt of one of the recursively forwarded request*" as further claimed in amended Claim 1, at least because the 'forwarding' relied upon in Jordon occurs after the owning server has stopped receiving such shifted forwarded requests. In fact, when a request for an object is received at a cache server, if the request is a forwarded request, the object is explicitly fetched from an origin web server. This fails to suggest "*recursively forwarding requests*", much less requests that are "*generated from different caches in the hierarchy based on ... a receipt of a recursively forwarded request at each of the different caches in the hierarchy*" as further claimed in amended Claim 1. For the requests that are forwarded, Jordan clearly discloses that they are derived from direct access to the cache server(para. [0031-0032], pg. 4 of Jordan), which also fails to suggest this limitation. Finally, cache servers in the disclosure of Jordan may even be excluded from receiving a forwarded request (para. [0034], pg. 4), which further fails to suggest "*requests, generated from different caches in the hierarchy based on ... receipt of one of the recursively forwarded requests at each of the different caches in the hierarchy*" as further claimed in amended Claim 1.

For these reasons, it is respectfully submitted that the prior art references, even when considered in combination with each other, do not teach or make obvious the claimed invention of amended Claim 1. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Claims 24 and 27 have been amended to include a similar, albeit different limitations. Amended Claim 24 claims forwarding a request generated by at least one hot cache for content to a lower level cache, even though the content is associated with a higher frequency of request.

Amended Claim 27 explicitly recites sending and receiving requests for the same content with a cache. As noted above for amended Claim 1, none of the cited prior art teaches or suggests the exchange and forwarding of requests as further claimed in these claims. Simply retrieving data, forwarding a same request, or receiving a response, as performed in the applied prior art, does not suggest the different limitations as claimed in these claims. For reasons similar to those presented herein with regards to amended Claim 1, and even amended Claim 12, withdrawal of the rejections of these claims is respectfully requested. Withdrawal of the rejection of Claim 28 is respectfully requested in light of at least the reasons presented herein with regards to its parent claim, amended Claim 27.

Dependent **Claims 2-7, 11, 13, 18, 20, and 22-23** were further rejected under 35 U.S.C. 103(a) in view of various combinations of prior art. As discussed above, amended independent Claims 1, 8, and 12, from which Claims 2-7, 11, 13, 18, 20, and 22-23 depend, are not suggested by the combinations of references applied thereto in the most recent Office Action. After a careful review of the additional references applied to these dependent claims under 35 U.S.C. § 103(a), it is respectfully submitted that these additional references, alone or in combination, do not further suggest the limitations of the amended independent claims as a whole. Therefore, for at least reasons similar to those discussed herein for amended independent Claims 1, 8, and 12, withdrawal of the rejections of these dependent claims is respectfully requested.

IV. Response to Arguments

In the most recent Office Action, specific remarks were provided in response to previous arguments regarding Claims 8 and 10. The further detail and explanation provided in these remarks is acknowledged and appreciated. However, in light of the following additional arguments, the applicant's representative respectfully disagrees with the positions taken in these remarks.

On page 25, lines 15-28, the Office Action states "While Wu teaches counting the number of requests for a particular object (lines 52-54 of column 6), is it (*sic*) understood that any number of different groupings may be used when determining how many requests are made". The applicant's representative respectfully disagrees. This statement in the Office Action provides clear indication

that Wu itself does not form the basis of this conclusion. Yet, no other source is provided, other than the indefinite but referenced "it". Even the various rationales listed with regards to *KSR International Co. v. Teleflex Inc. (KSR)*, shown, for example, in MPEP 2141 (III), at least involve that which is "known". However, neither Wu nor other prior art of record indicates that 'different groupings' are possible or "known" with regards to "the reference count" of Wu (col. 6, lines 52-54), much less provide an indication that they are desirable. As such, it is respectfully submitted that the conclusion of "it is understood" represents the application of an improper degree of hindsight. Wu simply does not substantiate this reasoning, explicitly or inherently, nor do the Office Action or the other prior art of record. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. § 103(a) be withdrawn.

On page 25, lines 18-19, the Office Action states, "This is a design choice that does not affect the way the system works, but merely changes the results, which are inconsequential to the system by nature". The applicant's representative respectfully disagrees. Because the "*a frequency*" further claimed in amended Claim 8 is "*summed from requests for all content of a plurality of different static content in a content set*", content other than the "*requested content*" is enabled to affect how the request for the content is handled. In the limitations positively recited in amended Claim 8, the influence of this other content is at least represented in the limitation of "*(b) if the frequency of requests...*", wherein the frequency of requests to an entire content set affects the handling of a request for specific content in the content set. While these limitations of amended Claim 8 clearly reflect the collective consequence – and novelty – of such an arrangement, a non-limiting, non-exhaustive example and additional details of one embodiment of such an arrangement are also disclosed on page 19, line 14 through page 20, line 18 of the specification as originally filed. Accordingly, it is respectfully submitted that the combination of limitations (a) and (b), as further represented in amended Claim 8 is not "inconsequential", but rather, reflects a novel result that is not rendered obvious by the applied collection of the prior art of record. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. § 103(a) be withdrawn.

On page 26, lines 5-21, the Office Action generally disagrees with deficiencies regarding Claim 10 that were cited in a previous response to a prior Office Action. The remarks in this

section of the most recent Office Action appear to generally equate a request sent after receipt of a redirected request (Wu, col. 6, lines 14-17) as the claimed "*third request*" in combination with the forwarding a request from a front end router 803 (Wu, col. 6, lines 43-46). It is respectfully submitted that this combination fails to suggest the limitations of Claim 10 as a whole. For example, as previously noted, the operations at the front end router 803 involve "whether to forward" a request, and thus, do not suggest "*a second request*" (col. 6, lines 43-46 of Wu); rather, this portion of Wu refers to *one* request. As such, even a request received from a web client after a previous request has been redirected (Wu, col. 6, lines 14-17) does not suggest "*a third request*" as further claimed in Claim 10. Further, this additional request is sent from the client browser based on the receipt of a redirected previous request, which does not suggest "*when the content is unavailable from the second cache*" as further claimed in Claim 10. This cited "request" from the browser is also sent to "an IP address corresponding to the suggested sibling web cache server" (col. 6, lines 14-19 of Wu), which fails to suggest "*to a content server*" as further claimed in Claim 10. Finally, the process of fetching an object from an originating cache server (1) (as noted in col. 6, lines 25-28 of Wu) still involves forwarding the same request that has already been received, even when "the request is coming from a sibling web cache server" (col. 4, lines 53-58). As such, even the combination noted in lines 15-18 on page 26 of the most recent Office Action fails to suggest a "*third request*" as further claimed in at least Claim 10. The recitation of any similar terms or elements in Wu simply does not suggest the limitations of Claim 10 as a whole. So far as other prior art of record does not cure this deficiency, withdrawal of the rejection under 35 U.S.C. §103(a) of Claim 10 is also respectfully requested.

CONCLUSION

In view of the above amendment, applicant's representative believes the pending application is in condition for allowance.

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Respectfully submitted,

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